

Remarks

Applicants have amended claims 1, 5-8, 10, 12, 16-17, 19, and 21. No new matter has been added to the application by virtue of the present amendment.

Therefore, claims 1-22 are pending in the subject application by virtue of the present amendment. Applicants respectfully submit that the amendments to claims 1, 5-8, 10, 12, 16-17, 19, and 21 more clearly define Applicants' application and distinguish it over the prior art of record. It is respectfully requested that the subject application be reconsidered and passed to issuance in view of this amendment and response.

Claim Rejections - 35 U.S.C. § 112

The Examiner rejected claims 1, 3-12 and 14-22 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regards as the invention.

With regards to **claims 1 and 12** Examiner has indicated that Step b) directed to a "sequencing production..." is not clearly defined and understood as to how this step is carried through. Also, the Examiner indicates that the limitation causes confusion since the whole plan or parts of the plan are being sequenced is not defined. Additionally, the Examiners states the "start variables" is not clearly defined because what these start variables pertains to is not understood. Further, the Examiner states that "variables" as used in the claim renders more than one or plural datum and therefore the limitation is not sufficiently defined. Additionally, the Examiner notes that "the bill of material" lacks proper antecedence, and "degree of infeasibility" comprises no clear and proper definition. Also, the Examiner indicates "degree of infeasibility" is a term of degree with no metes and bounds.

In Applicants claim 1 Step b) "sequencing production..." refers to the "sorting" as described in paragraph 0025 and 0039 of Applicants' invention. In paragraph 0025 and 0039 it describes how this step is carried out, i.e. the initial sequence of variables is determined by sorting

first based on production start date, next by bill-of-material (BOM) position, and finally by difference between the initial LP solution and the next higher feasible lot-sized value. Further, in paragraph 0039 the method of sequencing is further explained, i.e. the sequencing based on production start date is order by date from earliest to latest, sequencing by BOM position is done from bottom to top of the BOM, and finally sequencing by difference between the initial LP solution and the next higher feasible lot-sized value is done based on increasing in the discrepancy between the variable's value as computed from the relaxed LP and the next higher feasible lot-sized value. The Examiner indicates that the limitation causes confusion since the whole plan or parts of the plan are being sequenced is not defined. However, Applicants paragraph 0039 specifies that it is the variables (i.e. production start variables, see paragraph 0021) that are being sequenced in this Step b). Additionally, in paragraph 0021 of the present application it gives further insight into "sequencing production..."

Additionally, the Examiners states the "starts variables" is not clearly defined because what these start variables pertains to is not understood. In Applicants' present invention the term "start variables" refers to production start variables [0021]. Each production start considered in the LP has an associated production start variable. An example of such a variable is described in [0010], "...the LP may output a production start for 39.5 wafers although the manufacturing line may require each production start quantity to be a multiple of 24 wafers (e.g. wafer carrier may hold at most 24 wafers)". In this example a production start variable is that each production start quantity must be a multiple of 24 wafers, as each wafer carrier may hold at most 24 wafers. However, it should be noted that there may be tens of thousands of variables in semiconductor manufacturing. Variables as described in Applicants' present application are well known to those skilled in the art.

The Examiner further states that "variables" as used in the claim renders more than one or plural datum and therefore the limitation is not sufficiently defined. Applicants are not clear why the Examiner feels this is not sufficiently defined as variables is the plural form of variable. Applicants respectfully disagree that this is not sufficiently defined as Applicants have disclosed in the specification that there may be tens of thousands of variables in semiconductor manufacturing [0040].

Additionally, the Examiner stated that “the bill of material” lacks proper antecedence. Applicants have amended claim 1 and 12 and the appropriate correction has been made, therefore Examiner’s objection is overcome.

The Examiner has also stated that “degree of infeasibility” comprises no clear and proper definition, and that “degree of infeasibility” is a term of degree with no metes and bounds. “Degree of infeasibility” as described in the present application refers to and is defined by Applicants’ paragraph 0039 last sentence, “Finally, the sequence of variables for a given PN number, within a given period, is increasing in the discrepancy between the variable's value as computed from the relaxed LP and the next higher feasible lot-sized value.” “Degree of infeasibility” is the difference (which is used in sequencing) between the variables value as computed from the relaxed LP and the next higher feasible lot-sized value. Examiner indicates that “degree of infeasibility” is a term of degree with no metes and bounds. Applicant would respectfully disagree, as there are distinct and measurable values, i.e. the variables value as computed from the relaxed LP (initial value) and the next higher feasible lot-sized value, therefore the degree of infeasibility would be the degree of difference between those values (i.e. variable for a given PN number would fall somewhere in between these two values), and thus the term “degree of infeasibility” does indeed include metes and bounds.

In further regards to claims 1 and 12, Step c) claiming the limitation “modifying production...”, here the Examiner indicates “production starts” is stated, and plural datum is implied but not clearly identified. Also, the Examiner states the phrase “such that the resulting solution satisfies lot-size constraints and production constraints” does not establish a relationship with/to nor provides a nexus with the rest of the claim, so “such that...” is not properly supported. Additionally, the Examiner indicates the claim language possesses inconsistent language between steps b and c and is grammatical awkward; wherein, the “sequencing production start variables” and the “modifying production starts” do not agree.

It is unclear why Examiner feels “production starts” is not clearly identified as meaning

more than one or plural datum. The “production starts” simply refers to the starting production of a part during a specified period at a plant using a particular process. It may be required for a particular part to have more than one production start due to lot-sized constraints, e.g., need a 100 wafers; however, each production start can only have a start quantity of 25 wafers. Therefore, there would be 4 production starts needed to complete the 100 wafers.

The Examiner states the phrase “such that the resulting solution satisfies lot-size constraints and production constraints” does not establish a relationship with/to nor provides a nexus with the rest of the claim, so “such that...” is not properly supported. Applicants have amended claims 1 and 12, and believe that it now more particularly points out and distinctly claims the subject matter which Applicants regards as the invention and therefore Examiner’s objection is overcome.

Additionally, the Examiner indicates the claim language possesses inconsistent language between steps b and c and is grammatical awkward; wherein, the “sequencing production start variables” and the “modifying production starts” do not agree. Applicant respectfully disagree, “sequencing production start variables” and the “modifying production starts” pertain to two different limitation. In Step b) “sequencing production start variables” refers to the sequencing of the variables associated with a production start [[variables themselves]], whereas in Step c) “modifying production starts” refers to modifying the actual production starts based on the sequencing of the production start variables.

Therefore, Applicants believe that the rejection of claims 1 and 12 under 35 U.S.C. 112, second paragraph, has been overcome and it is respectfully requested that the pending claims be passed to issuance in view of the amendments and remarks.

With regards to **claims 3-4 and 14-15** Examiner has indicated that “sequencing production...” is not clearly defined and understood as to how this step is carried through. Also, the Examiner indicates that the limitation causes confusion since the whole plan or parts of the plan are being sequenced is not defined. Additionally, the Examiners states the “starts variables” is not

clearly defined because what these start variables pertain to is not understood. Further, the Examiner states that “variables” as used in the claim renders more than one or plural datum and therefore the limitation is not sufficiently defined.

Applicants refer the Examiner to the above stated arguments with regards to claims 1 and 12 as applicable to the objections Examiner has stated for claims 3-4 and 14-15.

Therefore, Applicants believe that the rejection of claims 3-4 and 14-15 under 35 U.S.C. 112, second paragraph, has been overcome and it is respectfully requested that the pending claims be passed to issuance in view of the amendments and remarks.

With regards to **claims 5-6 and 16-17** Examiner has indicated that the term “permissible,” as used in the claims, is used as a term of degree defining constraints. Examiner notes that when a term of degree is used as a limitation, it is necessary to determine whether the specification provides some standard for measuring that degree. Examiner indicates in this case, the specification does not enable one skilled in the art to reasonably establish what may be construed as being within the metes and bounds of the word degree.

Claims 5-6 and 16-17 have been amended to delete “permissible” from the claim and replaced it with “possible”. Support for Applicants’ amendment can be found in paragraph 0040 of the present application. Applicants believe that claims 5-6 and 16-17 as amended now more particularly points out and distinctly claims the subject matter which Applicants regards as the invention and therefore Examiner’s objection is overcome.

Therefore, Applicants believe that the rejection of claims 5-6 and 16-17 under 35 U.S.C. 112, second paragraph, is moot and therefore overcome and it is respectfully requested that the pending claims be passed to issuance in view of the amendments and remarks.

With regards to **claims 7 and 18** Examiner has indicated that Step a) claims “separating production start variables”, and the “start variables” are not clearly defined because what these

start variables pertains to is not understood. Further, the Examiner states that “variables” as used in the claim renders more than one or plural datum and therefore the limitation is not sufficiently defined.

Applicants, refer the Examiner to the above arguments with regards to claim 1 and 12 as applicable to the objections Examiner has stated regarding “start variables” and “variables”.

With further regard to claims 7 and 18 Examiner has also indicated that in Step b) the limitation of “relaxing imposed lot sizing constraints using linear programming methods” seems to be addressing the programming and usually, constraints are “relaxed” not the programming. The Examiner indicates the limitation presents grammatically awkward phrasing, which leads to vagueness in the claim language.

Applicants, respectfully disagree with Examiner’s position that the limitation presents grammatically awkward phrasing, which leads to vagueness in the claim language. The claim as worded clearly states that the “lot sizing constraints” are relaxed and that they are relaxed using linear programming methods. Examiner states that the limitation seems to be addressing the programming and usually, constraints are “relaxed” not the programming. Applicants would agree, that is the constraints that are relaxed, but do not see how Examiner interprets the claim language as written to read as the programming be relaxed. Those skilled in the art know that relaxing constraints means to ignore them (see the first sentence in Applicants’ paragraph 0021 "... referred to as the relaxed LP since it ignores lot-sizing constraints." See also the last sentence of Applicants’ paragraph 38 "... initially relaxed (without lot sizing) LP...").

Therefore, Applicants believe that the rejection of claims 7 and 18 under 35 U.S.C. 112, second paragraph, has been overcome and it is respectfully requested that the pending claims be passed to issuance in view of the amendments and remarks.

With regards to **claims 8 and 19** Examiner has indicated that the “start variables” are not clearly defined because what these start variables pertains to is not understood. Further, the

Examiner states that “variables” as used in the claim renders more than one or plural datum and therefore the limitation is not sufficiently defined. Additionally, the Examiner indicates “the bill of materials” lacks proper antecedence and “degree of infeasibility” comprises no clear and proper definition.

Applicants, refer the Examiner to the above arguments with regards to claim 1 and 12 as applicable to the objections Examiner has stated regarding “start variables,” “variables,” and “degree of infeasibility”.

The Examiner stated that “the bill of material” lacks proper antecedence. Applicant has amended claim 8 and 19 and the appropriate correction has been made, therefore Examiner’s objection is overcome.

Therefore, Applicants believe that the rejection of claims 8 and 19 under 35 U.S.C. 112, second paragraph, has been overcome and it is respectfully requested that the pending claims be passed to issuance in view of the amendments and remarks.

With regards to **claims 9 and 20** Examiner has indicated that the step of “iteratively solving” is grammatically awkward and contributes to the vagueness of the claimed limitation.

Iteratively means repeating; making repetition; repetitious. (see iteratively. (n.d.). Dictionary.com Unabridged (v 1.0.1). Retrieved October 31, 2006, from Dictionary.com website: <http://dictionary.reference.com/browse/iteratively>). Therefore, in Applicants’ present application the step of “iteratively solving” means repeatedly solving. Applicants’ paragraph 0044 and figure 6 distinctly show and describe the step of “iteratively solving.” Specifically as shown in figure 6 substep (iv) which shows a loop back arrow to indicate that this is an iterative process. Also, in paragraph 0044 it states, “The search iterates (e.g., repeats) through sub-problems until either the solution improvement for a pass through the subsets is below some user defined tolerance, or else the total run time exceeds the allotted time specified by the user...”. Thus, Applicants believe the limitation of “iteratively solving” is clearly described and supported in the specification.

Therefore, Applicants believe that the rejection of claims 9 and 20 under 35 U.S.C. 112, second paragraph, has been overcome and it is respectfully requested that the pending claims be passed to issuance in view of the amendments and remarks.

With regards to **claims 10-11 and 21-22** Examiner has indicated that “relaxed linear program” lacks proper antecedence.

Applicant has amended claim 10 and 21 (11 and 22 are dependent on 10 and 21 respectively) and the appropriate correction has been made.

Therefore, Applicants believe that the rejection of claims 10-11 and 21-22 under 35 U.S.C. 112, second paragraph, has been overcome and it is respectfully requested that the pending claims be passed to issuance in view of the amendments and remarks.

Applicant believes that claims 1, 3-12 and 14-22, as amended, and based on the remarks above now particularly point out and distinctly claim the subject matter which Applicant regards as the invention and, therefore, overcomes the examiner’s rejection under 35 U.S.C. § 112, second paragraph.

Claim Rejections - 35 U.S.C. § 102(b)

The Examiner rejected claims 1-22 under 35 U.S.C. § 102(b), as being anticipated by Miller, U.S. Patent No. 5,408,663, hereinafter Miller. The Examiner states that Miller teaches using linear programming techniques to adjust the starting and ending times of various tasks until the maximum resource demand for each time is optimized and in doing so Miller discloses the limitations of Applicants’ invention. The Examiner further indicates that Miller states that the data that is input includes data defining factors of duration, cost, and /or risk. Additionally, the Examiner states that the method as taught by Miller at column 5, beginning at line 27, is explained as testing each task on the work schedule to determine whether or not the resources allocated to the task would permit completion of the task in a shorter duration than the duration assigned to the task

in the schedule, if so, generating a positive test signal, fulfilling a degree of feasibility. This testing process is continued until no positive signal, a degree of feasibility, is generated. Thereby, indicating that the last computed working schedule is substantially an optimum schedule.

Applicants respectfully traverse the rejection under 35 U.S.C. § 102(b), and submit that Miller does not anticipate or suggest applicants' independent claims 1, 7, 12 as amended and 18 or claims dependent thereupon.

The Miller prior art referenced by Examiner is very different than Applicants' present invention. Applicants' invention is a method for lot-sizing, and Miller does not even mention or make reference to lot-sizes. Applicants' invention facilitates creation of a production plan, whereas Miller with a project schedule (i.e. set of tasks that need to be accomplished to deliver a--typically single--objective such as building a house or designing a military aircraft). The Examiner has reference only a few points of Miller and has then made a sweeping generalization that it anticipates all 22 of Applicants' claims.

With regards to Applicants' independent claim 1, Miller does not anticipate or suggest the limitation of Step b) "sequencing production start variables based on start date, position in a bill-of-material, and degree of infeasibility". Miller does not make any reference whatsoever to "production start variables", "bill of material", nor Applicants' context of "degree of infeasibility". As such Miller can certainly not anticipate or suggest the limitation of sequencing the production start variables as claimed in Applicants present invention, and therefore does not anticipate all the elements as claimed in Applicants' present invention. Further, Miller does not anticipate or suggest the limitations in Step c) of "modifying production starts in this sequence" and "such that lot-size constraints and production constraints are satisfied". "Modifying production starts in this sequence" refers to modifying the production starts based on the sequencing of earlier Step b) which as argued above is not anticipate or suggested by Miller and therefore neither can this limitation be anticipated or suggested by Miller. Also, as stated above Miller does not describe or make any reference to "lot-size constraints", therefore the limitation of Step c) regarding "...lot-size constraints and production constraints are satisfied" is not anticipated or suggested by

Miller.

With regards to Applicants' independent claim 7, Miller does not refer to, mention, or describe the elements "production start variables" or "lot-sized constraints", therefore, Miller does not anticipate or suggest the limitation of Step a) "separating production start variables into a plurality of sub-problems" or Step b) "relaxing imposed lot-sizing constraints using linear programming methods".

With regards to Applicants' independent claim 12, Miller does not anticipate or suggest the limitation of Step b) "sequencing production start variables based on start date, position in a bill-of-material, and degree of infeasibility". Miller does not make any reference whatsoever to "production start variables", "bill of material", nor Applicants' context of "degree of infeasibility". As such, Miller can certainly not anticipate or suggest the limitation of sequencing the production start variables as claimed in Applicants present invention, and therefore does not anticipate all the elements as claimed in Applicants' present invention. Further, Miller does not anticipate or suggest the limitations in Step c) of "modifying production starts in this sequence" and "such that lot-size constraints and production constraints are satisfied". "Modifying production starts in this sequence" refers to modifying the production starts based on the sequencing of earlier Step b) which as argued above is not anticipate or suggested by Miller and therefore neither can this limitation be anticipated or suggested by Miller. Also, as stated above Miller does not describe or make any reference to "lot-size constraints", therefore the limitation of Step c) regarding "...lot-size constraints and production constraints are satisfied" is not anticipated or suggested by Miller.

With regards to Applicants' independent claim 18, Miller does not refer to, mention, or describe the elements "production start variables" or "lot-sized constraints", therefore, Miller does not anticipate or suggest the limitation of Step a) "separating production start variables into a plurality of sub-problems" or Step b) "relaxing imposed lot-sizing constraints using linear programming methods".

Claims 2-6, 8-11, 13-17, and 19-22 are dependent upon Claims 1, 7, 12, and 18 respectively; and as discussed above, Claim 1, 7, 12, and 18, as amended, are not anticipated by Miller because Miller does not disclose all the elements of Claims 1, 7, 12, and 18, as amended. Therefore, Applicants respectfully submit that the rejection of Claims 1-22 under 35 U.S.C. 102(b) in view of Miller has been overcome and it is respectfully requested that the pending claims be passed to issuance in view of the remarks.

Therefore, Applicants respectfully submit that the rejection of Claims 1-22 under 35 U.S.C. § 102(b) in view of Miller has been overcome and it is respectfully requested that the pending claims be passed to issuance in view of the amendments and remarks.

Prior Art Made of Record and Not Relied Upon

Applicants have reviewed the prior art made of record:

US Patent Application No. US 2004/0030428 A1	Crampton et al.
US Patent Application No. US 2002/0156669 A1	Verbaegh et al.
US Patent Application No. US 2003/0229550 A1	DiPrima et al.

and respectfully submit that the prior art made of record does not anticipate, teach or suggest Applicants' independent claims 1, 7, 12 as amended and 18.

Conclusion

In light of the foregoing remarks, all of the claims now presented are believed to be in condition for allowance, and Applicants respectfully request that the outstanding rejections be withdrawn and this application be passed to issue at an early date.

The Examiner is urged to call the undersigned at the number listed below if, in the Examiner's opinion, such a phone conference would aid in furthering the prosecution of this application. No fee is due by virtue of this response. However, if the PTO determines that a fee is required, please charge Applicants' Deposit Account, 09-0456.

Respectfully submitted,
For: Denton, et al.

By: /Ryan Simmons/
Ryan K. Simmons
Registration No. 45,848
Telephone No.: (802) 769-1809
Fax No.: (802) 769-8938
EMAIL: rksimmon@us.ibm.com

International Business Machines Corporation
Intellectual Property Law - Mail 972E
1000 River Road
Essex Junction, VT 05452